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60,130-1985; 03MRA0135
10/775,033

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Lee Watts, et al.
Serial No.:	10/775,033
Filed:	February 9, 2004
Group Art Unit:	3753
Examiner:	Fox, John C.
Title:	EXHAUST PIPE VALVE

M/S AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Dear Sir:

Appellant submits this Appeal Brief pursuant to the Notice of Appeal filed July 12, 2006. Enclosed is a check for the appeal brief fee. Any additional fees or credits may be charged or applied to Deposit Account No. 50-1482 in the name of Carlson, Gaskey & Olds.

REAL PARTY IN INTEREST

The real party in interest is Arvin Technologies, Inc., assignee of the present invention.

RELATED APPEALS AND INTERFERENCES

There are no prior or pending appeals, interferences or judicial proceedings related to this appeal, or which may directly affect or may be directly affected by, or have a bearing on, the Board's decision in this appeal.

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STATUS OF CLAIMS

Claims 1 and 3-25 are pending, rejected, and appealed.

STATUS OF AMENDMENTS

All amendments and responses have been entered and considered.

SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 1 is directed to an exhaust pipe valve that includes a housing 12; a bearing sleeve 22 mounted in the housing 12 and having a primary bearing surface; a valve spindle 16 rotatably mounted in the bearing sleeve 22 and having a primary sealing surface that cooperates with the primary bearing surface of the bearing sleeve 22; and a valve plate 14 mounted at the valve spindle 16, wherein the primary bearing surface of the bearing sleeve 22 faces the valve plate 14. See page 6, lines 6-14; Figure 3. Claim 1 further recites a washer 30 arranged on the valve spindle 16, wherein the washer 30 cooperates with the bearing sleeve 22 on a side of the bearing sleeve 22 that faces away from the valve plate 14, the side of the bearing sleeve 22 that faces away from the valve plate 14 being a secondary bearing surface, and wherein the washer 30 has a secondary sealing surface that cooperates with the secondary bearing surface. See page 6, lines 26-30; Figure 3. Finally, claim 1 recites a spring 32 that biases the primary sealing surface of the valve spindle 16 against the primary bearing surface of the bearing sleeve 22 while biasing the washer 30 against the bearing sleeve 22. See page 4, line 29 through page 5, line 7; page 7, lines 3-6; Figure 3.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Claims 1, 3-5, 11, 13, and 16 stand rejected under 35 U.S.C. 102(b) as being anticipated by Thauer (US 3693935).

B. Claims 6 and 14-15 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Thauer (US 3693935) in view of Kipp et al. (US 5630571).

C. Claims 7-10, 12, and 17-18 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Thauer alone.

D. Claims 19-22 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Thauer in view of Lee (US 5631761) and Welty et al. (US 6935618).

E. Claims 23-25 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Thauer in view of Rautenstauch (US 1991173).

ARGUMENT

A. Anticipation Rejection Over Thauer

Claims 1, 3-5, 11, 13, and 16 stand rejected under 35 U.S.C. 102(b) as being anticipated by Thauer (US 3693935). Claim 1 recites that the side of the bearing sleeve that faces away from the valve plate is a secondary bearing surface, and that the washer has a secondary sealing surface that cooperates with the secondary bearing surface. Thauer does not disclose this feature.

Thauer explicitly discloses that the valve shaft 5 is supported and sealed *only* at conical surfaces 9, 10. See col. 2, lines 43-50, which states that these conical surfaces "maintain a complete and adequate seal to prevent escape of gasses from the interior of the exhaust pipe 2 through the clearance space between the internal walls of the [bore] 3a and the shaft 5." Thus, no secondary sealing is provided as Thauer teaches that only a single seal is necessary.

Further, Thauer states that these conical surfaces cooperate to center the valve shaft 5 "to maintain it concentrically within the bore 3a to provide adequate clearance for a full 360° between the shaft and the bore . . . ." See col. 2, lines 51-59. The examiner presents the argument that the upper face of component 13 and the lower face of component 3 comprise sealing surfaces. However, in order to be considered as corresponding to the claimed sealing surfaces, the surfaces must provide a "sealing" effect. Any gas that leaks beyond the conical surfaces 9, 10 flows through the clearance between the shaft 5 and the bore 3a and through the clearance between the washer 13 and the shaft 5. The washer 13 of Thauer does not, and cannot, provide a sealing effect.

Further, one of ordinary skill in the art would not consider Thauer as providing secondary sealing between the components 13 and 3. Thauer describes component 13 as an insulating disc that is provided to shield the spring from the effect of heat from the exhaust pipe. See col. 2, lines 36-39. There is no disclosure or suggestion in Thauer that this insulating disc additionally has a sealing surface or provides any type of sealing effect.

The examiner argues that surfaces of components 13 and 3 in Thauer can be considered as sealing faces because they are flat abutting surfaces. The examiner further argues that "it would be inherent to this structure that a seal of some degree is formed between the washer and bearing. For example, a sufficient seal to prevent atmospheric gases from entering the bearing." Appellant respectfully asserts that this is not a reasonable interpretation of Thauer.

As discussed above, element 13 in Thauer comprises an insulating disc that is used to shield the spring 11 from the effect of heat from the exhaust pipe 2. See col. 2, lines 36-40. This insulating disc 13 does not, and cannot, provide a sealing effect. In the only Figure of Thauer, it is clear that there is an air gap between the outer surface of the shaft 5 and an inner circumference of the insulating disc 13. Gases can clearly flow through this air gap and into the bearing 3. Thus, the insulating disc 13 is structurally incapable of providing secondary sealing as defined in the claims.

Further, the insulating disc 13 does not even satisfy the examiner's example of a "sufficient seal to prevent atmospheric gases from entering the bearing" because, as explained above, gases can clearly enter the bearing via a center opening in the insulating disc 13.

The examiner argues that it is "inherent" that there is a seal at this location in Thauer, however, the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic." In re Rijckaert, 9 F.3d 1531, 1534; 28 USPQ2d 1955, 1957 (Fed. Cir. 1993). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. There mere fact

that a certain thing may result from a given set of circumstances is not sufficient.'" In re Robertson, 169 F.3d 743; 49 USPQ2d 1949, 1950-1951 (Fed. Cir. 1999).

"In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990). The examiner argues that the insulating disc 13 of Thauer is inherently a seal; however, this contradicts the Figure of Thauer, which shows a gap between the disc 13 and the shaft 5. The examiner has not provided any basis in fact or technical reasoning to support the assertion that gases do not leak through this gap into the bearing.

Thus, for the reasons set forth above, claims 1, 3-5, 11, 13, and 16 are not anticipated by Thauer.

B. Obviousness Rejection Over Thauer and Kipp

Claims 6 and 14-15 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Thauer (US 3693935) in view of Kipp et al. (US 5630571). For the reasons set forth above, Thauer does not disclose, suggest, or teach the claimed invention. Kipp does not make up for the deficiencies of Thauer.

Claim 6 recites that the spring is a spring washer. The examiner argues that it would be obvious to use a wave spring as disclosed in Kipp in place of the coil spring taught by Thauer. Appellant respectfully disagrees. There is no teaching in Thauer or Kipp to suggest that a wave spring would be appropriate for the configuration taught by Thauer. The Figure of Thauer shows that the coil spring cannot be simply interchanged with a wave washer as implied by the examiner. Thus, appellant respectfully asserts that there is no motivation or suggestion to modify Thauer in the manner proposed by the examiner.

Claim 14 recites that the bearing sleeve is press-fitted into the housing. The examiner argues that it would be obvious to replace the threaded attachment of Thauer with a press-fit

attachment as taught by Kipp to secure the sleeve better. Applicant asserts that there is no motivation or suggestion to modify Thauer in the manner proposed by the examiner.

One of the benefits provided by Thauer is that the shaft 5, valve 7, bearing 3, spring 11, and lever 12 are pre-assembled as a unit prior to application to the pipe 2, such that the unit can be easily installed by threading the bearing 3 into the bore 1. See col. 2, line 64 through col. 3, line 5. The examiner's proposed modification would require the elimination of the threaded attachment assembly, which would defeat one of the benefits provided by Thauer. The examiner's proposed modification cannot render the prior art unsatisfactory for its intended purpose and cannot change the principle of operation of the base reference. See MPEP 2143.01. Further, there is no indication in Kipp or the prior art that a press-fit is more easily installed than a threaded attachment, and there is nothing in Kipp or the prior art indicating that a press-fit is a more secure attachment than the threaded attachment. Thus, there is no motivation or suggestion to modify Thauer in the manner proposed by the examiner.

Appellant respectfully asserts that claims 6 and 14-15 are allowable over the recited combination.

C. Obviousness Rejection Over Thauer

Claims 7-10, 12, and 17-18 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Thauer alone. Claim 7 recites that the spring is made from a nickel-chromium-iron alloy. The examiner argues that the recited material would be an obvious matter of engineering design choice. Appellant disagrees.

Appellant utilizes a spring washer formed from the claimed material which provides certain benefits for a spring washer configuration. See page 4, line 29 through page 5, line 7. Thauer discloses the use of a coil spring. Thauer does not disclose that the coil spring 11 is made from a material such as that defined in claim 7. Further, Thauer does not disclose or teach that the material set forth in claim 7 would be appropriate for the coil spring 11. Thus, appellant respectfully asserts that it is not obvious to modify Thauer in the manner proposed by the examiner. For similar reasons, claim 8 is also allowable over Thauer.

Claim 10 recites that the valve spindle is made from a steel the steel that has a Werkstoff No. 1.4122 or 1.4104. The examiner argues that the recited material would be an obvious matter of engineering design choice. Appellant disagrees. Thauer does mention any type of material for the valve spindle. As such, there is no teaching in Thauer to suggest that the specified steel would be appropriate for a valve spindle. The only disclosure of the appropriateness of the claimed material is found in appellant's disclosure.

Claim 17 recites that the bearing sleeve is made from steel. The examiner argues that the recited material would be an obvious matter of engineering design choice. Appellant disagrees. Thauer does mention any type of material for the bearing sleeve. As such, there is no teaching in Thauer to suggest that steel would be appropriate an appropriate material for a bearing sleeve in the claimed configuration. Thus, claim 17 is allowable over Thauer.

There certainly is no disclosure of a bearing sleeve made from a steel that has a Werkstoff No. 1.4122 or 1.4104 as defined in claim 18. Applicant asserts that it is not obvious to use such a material in the claimed configuration and requests that the rejection of claim 18 be reversed.

D. Obviousness Rejection Over Thauer, Lee, and Welty

Claims 19-22 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Thauer in view of Lee (US 5631761) and Welty et al. (US 6935618). For the reasons set forth above, Thauer does not disclose, suggest, or teach the claimed invention. Neither Lee nor Welty make up for the deficiencies of Thauer.

Further, claim 19 recites a ceramic coating that is disposed on at least a portion of at least one of the valve spindle and the washer. The examiner argues that it would be obvious to modify Thauer to include a coating at this location to reduce friction between the bearing surfaces. Appellant disagrees.

The component in Thauer, which the examiner argues corresponds to the claimed washer, is element 13. As discussed above, there is no bearing or sealing surface between component 13 and shaft 5 of Thauer because these components do not touch each other. There is an air gap

between the outer surface of shaft 5 and the inner circumference of the insulating disc 13. There would be no reason to modify these components to include anti-friction coatings because there is not a friction interface between these components. Thus, there is no motivation or suggestion to modify Thauer in the manner proposed by the examiner.

Further, the examiner relies on Lee to teach a bearing with antifriction coatings to reduce friction between mating surfaces of a bearing. The examiner additionally relies on Welty to teach certain types of coatings, and argues that it would be obvious to use the plural coatings in the valve of Thauer to reduce friction in view of the teaching reference of Lee, which shows the desirability of such coatings in bearings.

However, Lee is directed to a drive motor that is used to rotate a multi-faceted mirror, which is used to change the path of a laser beam in a laser printer. The bearing in Thauer is used in an exhaust system and is subjected to extremely high temperatures. The environment in which the bearing of Lee operates, is in no way similar to that of Thauer, i.e. the bearing of Lee is not subjected to high temperatures. There is no disclosure in Lee or Welty to suggest that the Lee or Welty coatings would be appropriate for a high temperature environment such as that of Thauer. The examiner is clearly engaging in hindsight reconstruction of the claimed invention, using appellant's structure as a template and selecting elements from the references to fill the gaps. This is not permissible under 35 U.S.C. 103(a). Thus, for the reasons set forth above, claim 19 is allowable over the recited combination.

Claim 20 recites that the ceramic coating comprises at least one selected from the group consisting of titanium, aluminum, and chromium. None of the references disclose such a coating for use in a high temperature exhaust environment such as that of Thauer. Thus, claim 20 is allowable over the recited combination.

Claim 21 recites that the ceramic coating further comprises at least one of yttrium and nitrogen. Again, none of the references disclose such a coating having a combination of elements set forth in claim 20 and 21. Further, none of the references disclose or suggestion that the claimed coating is appropriate for use in high temperature applications such as that of Thauer. Thus, claim 21 is allowable over the recited combination.

Claim 22 recites the feature of a second ceramic coating disposed on the ceramic coating, wherein the second ceramic coating comprises at least one selected from the group consisting of titanium, aluminum, and chromium. None of the references discloses a combination of two ceramic coatings as claimed, which would be capable of operating in the high temperature environment of Thauer.

The two coatings 21, 23 of Welty identified by the examiner as corresponding to the claimed two ceramic coatings, are not identified as being useful or appropriate for use with exhaust system components. The Welty coatings are used for water mixing valves, which operate under significantly different operating conditions than exhaust valves. One coating of Welty, i.e. layer 23, is disclosed as being used for a strengthening layer that has a high hardness. See col. 4, lines 57-58. The other coating of Welty, i.e. layer 21, is disclosed as being used for an adhesion-promoting layer. See col. 5, lines 41-46. There is no disclosure or teaching in Welty to suggest that these coatings would be beneficial or useful for a configuration and environment such as that of Thauer. Thus, claim 22 is allowable over the recited combination.

E. Obviousness Rejection Over Thauer and Kipp

Claims 23-25 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Thauer in view of Rautenstauch (US 1991173). Claim 23 recites that the washer has a very close running

clearance between an inner opening of the washer and the valve spindle to prevent gas from flowing between the washer and the valve spindle.

The examiner admits that Thauer does not disclose the features of claim 23 and relies on Rautenstauch for modifying Thauer. Specifically, the examiner argues that bolted down gland 36 of Rautenstauch has a running fit with stem 16 and a conical profile, and that this gland 36 is analogous to the spring 11 and washer 13 of Thauer. Appellant disagrees with this characterization of element 36 of Rautenstauch.

Element 36 comprises a gland that is used to enclose a packing 35 inside a retainer 26 fixed to a housing 10. Bolts 41 are threaded through the gland 36 and the retainer 26. First, this threaded attachment interface does not provide any type of resilient bias or spring force such as the spring 11 of Thauer, which holds sealing surfaces 9, 10 together. Further, the resiliency of spring 11 is required in Thauer to maintain the shaft 5 concentrically within the bore 3a to provide adequate clearance. This centering function and clearance provision clearly would not be accomplished by the threaded attachment of Rautenstauch, and thus the threaded attachment cannot be reasonably considered as analogous to the spring and washer of Thauer..

Second, the gland 36 does not provide any type of insulating function to shield a spring from the effect of heat from an exhaust pipe, such as that provided by the insulating disc 13 in Thauer. As the gland 36 of Rautenstauch is clearly neither a spring nor an insulating disc, appellant respectfully asserts that it is not reasonable to interpret the gland 36 as corresponding to the spring 11 and washer 13 of Thauer.

As such, Rautenstauch does not disclose a washer with a secondary sealing surface to prevent gas from flowing between the washer and the valve spindle as defined in the claims. As discussed above, the examiner has admitted that Thauer also does not disclose structures as defined in claims 23-25. Thus, the references do not disclose, suggest, or teach all of the claimed features.

Further, with regard to claims 23-25, the examiner argues that it would have been obvious to have used a packing and bearing configuration as taught by Rautenstauch in the valve of Thauer to improve the seal thereof. There is no support for the examiner's assertion found

anywhere in the references. The examiner has pointed to no teaching in Rautenstauch of any particular benefit to using the Rautenstauch packing and bearing in place of the Thauer bearing configuration. In addition, there is nothing in Thauer that would have led one of ordinary skill in the art to believe that Thauer's bearing was in any way deficient for Thauer's purposes or was in need of modification. The valve structures shown in Rautenstauch and Thauer are very different from each other and there is nothing in either of the references to indicate that the bearing configuration of Rautenstauch is in any way capable of being used in an exhaust valve application such as that of Thauer. There certainly is no suggestion in the references that the bearing configuration of Rautenstauch would provide a better seal than that of Thauer. The examiner is clearly engaging in a hindsight reconstruction of the claimed invention, using appellant's structure as a template and selecting elements from the references to fill the gaps. This is not the proper basis for sustaining a rejection under 35 U.S.C. 103(a).

Further, the spring and bearing configuration of Thauer provide the beneficial feature of providing a centering function such that adequate clearance is provided between the shaft and bore. This beneficial configuration prevents binding engagement of the shaft 5 within the bearing 3 within the bore. See col. 1, lines 7-24; col. 2, lines 54-59. To modify Thauer to replace the spring and bearing configuration with the packing and bearing configuration of Rautenstauch would destroy the benefits provided by Thauer. The proposed modification cannot render the prior art unsatisfactory for its intended purpose (see MPEP 2143.01 (V)) and cannot change the principle of operation of a reference (see MPEP 2143.01 (VI)). If the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. In re Gordon, 7233 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Appellant respectfully asserts that there is no motivation or suggestion to modify Thauer in the manner proposed by the examiner because such a modification would render the prior art unsatisfactory for its intended purpose and would change the principle of operation of Thauer. Thus, for the reasons set forth above, claim 23 is allowable over the recited combination.

Claim 24 recites that the secondary sealing and secondary bearing surfaces have conical profiles. None of the references disclose secondary sealing and bearing surfaces having the claimed profile in combination with the claimed primary sealing and bearing surfaces. The examiner argues that it would be obvious to use the packing and bearing configuration of Rautenstauch in the valve of Thauer to improve the seal thereof. For the reasons set forth above, appellant asserts that there is no suggestion or motivation to make this modification. Additionally, even if such a modification were proper, the end result would not provide the combination of primary and second bearing and sealing surfaces as defined in claim 24. Thus, claim 24 is allowable over the recited combination.

Claim 25 recites that the primary sealing surface and the primary bearing surface each have a conical profile that cooperate with each other to form a primary seal and wherein the secondary sealing surface and the secondary bearing surface each have a conical profile that cooperate with each other to form a secondary seal. None of the references disclose the claimed combination of first and second seals.

Thauer clearly does not include first and second seals. The insulating disc 13 of Thauer does not form a seal, and thus cannot be reasonably interpreted as providing a seal. The examiner argues that it would be obvious to use the packing and bearing configuration of Rautenstauch in the valve of Thauer to *improve* the seal thereof, however, this would not provide first and second seals as defined in the claims. Further, for the reasons set forth above, appellant asserts that there is no suggestion or motivation to make the examiner's proposed modification. Thus, claim 25 is also allowable over the recited combination for the additional reasons set forth above..

CONCLUSION

For the reasons set forth above, the rejection of all claims is improper and should be reversed. Appellant earnestly requests such an action.

Respectfully submitted,

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Dated: September 5, 2006

CERTIFICATE OF MAIL

I hereby certify that the enclosed Appeal Brief is being deposited with the United States Postal Service as First Class Mail, postage prepaid, in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 5 day of September, 2006.

Laura Combs

CLAIMS APPENDIX

1. An exhaust pipe valve, comprising:

a housing;

a bearing sleeve mounted in the housing and having a primary bearing surface;

a valve spindle rotatably mounted in the bearing sleeve and having a primary sealing surface that cooperates with the primary bearing surface of the bearing sleeve;

a valve plate mounted at the valve spindle, wherein the primary bearing surface of the bearing sleeve faces the valve plate;

a washer arranged on the valve spindle, wherein the washer cooperates with the bearing sleeve on a side of the bearing sleeve that faces away from the valve plate, the side of the bearing sleeve that faces away from the valve plate being a secondary bearing surface, and wherein the washer has a secondary sealing surface that cooperates with the secondary bearing surface; and

a spring that biases the primary sealing surface of the valve spindle against the primary bearing surface of the bearing sleeve while biasing the washer against the bearing sleeve.

3. The exhaust pipe valve according to claim 1, wherein at least one of the primary sealing surface, the secondary sealing surface, the primary bearing surface and the secondary bearing surface has a conical profile.

4. The exhaust pipe valve according to claim 1, wherein at least one of the primary sealing surface and the primary bearing surface has a conical profile.

5. The exhaust pipe valve according to claim 1, further comprising a nut mounted on the valve spindle, wherein the spring is disposed between the nut mounted on the valve spindle and the washer.

6. The exhaust pipe valve according to claim 5, wherein the spring is a spring washer.

7. The exhaust pipe valve according to claim 1, wherein the spring is made from a nickel-chromium-iron alloy.

8. The exhaust pipe valve according to claim 7, wherein the nickel-chromium-iron alloy is INCONEL.

9. The exhaust pipe valve according to claim 1, wherein the valve spindle is made from steel.

10. The exhaust pipe according to claim 9, wherein the steel has a Werkstoff No. 1.4122 or 1.4104.

11. The exhaust pipe valve according to claim 1, wherein the valve plate is mounted centrically at the valve spindle and cooperates with an inner wall of the housing.

12. The exhaust pipe valve according to claim 1, wherein the valve plate is mounted eccentrically at the valve spindle and cooperates with two valve seats in an interior of the housing.

13. The exhaust pipe valve according to claim 1, further comprising a lever attached to the valve spindle for operation of the valve plate.

14. The exhaust pipe valve according to claim 1, wherein the bearing sleeve is press-fitted into the housing.

15. The exhaust pipe valve according to claim 14, wherein the housing comprises a cylindrical portion in which the bearing sleeve is fitted.

16. The exhaust pipe valve according to claim 1, wherein the bearing sleeve is fixed in the housing in a form-locking manner.

17. The exhaust pipe valve according to claim 1, wherein the bearing sleeve is made from steel.

18. The exhaust pipe valve according to claim 17, wherein the steel has a Werkstoff No. 1.4122 or 1.4104.

19. The exhaust pipe valve according to claim 1, further comprising a ceramic coating disposed on at least a portion of at least one of the valve spindle and the washer.

20. The exhaust pipe valve according to claim 19, wherein the ceramic coating comprises at least one selected from the group consisting of titanium, aluminum, and chromium.

21. The exhaust pipe valve according to claim 20, wherein the ceramic coating further comprises at least one of yttrium and nitrogen.

22. The exhaust pipe valve of claim 19, further comprising a second ceramic coating disposed on the ceramic coating, wherein the second ceramic coating comprises at least one selected from the group consisting of titanium, aluminum, and chromium.

23. The exhaust pipe valve according to claim 1 wherein the washer has a very close running clearance between an inner opening of the washer and the valve spindle to prevent gas from flowing between the washer and the valve spindle.

24. The exhaust pipe valve according to claim 1 wherein the secondary sealing and secondary bearing surfaces have conical profiles.

25. The exhaust pipe valve according to claim 1 wherein the primary sealing surface and the primary bearing surface each have a conical profile that cooperate with each other to form a primary seal and wherein the secondary sealing surface and the secondary bearing surface each have a conical profile that cooperate with each other to form a secondary seal.

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS APPENDIX

None